National Institute of Environmental Health Sciences

# Warming oceans, phytoplankton, and river discharge: Implications for cholera outbreaks

**Author(s):** Jutla AS, Akanda AS, Griffiths JK, Colwell R, Islam S
**Year:** 2011
**Journal:** The American Journal of Tropical Medicine and Hygiene. 85 (2): 303-308

**Abstract:**

Phytoplankton abundance is inversely related to sea surface temperature (SST). However, a positive relationship is observed between SST and phytoplankton abundance in coastal waters of Bay of Bengal. This has led to an assertion that in a warming climate, rise in SST may increase phytoplankton blooms and, therefore, cholera outbreaks. Here, we explain why a positive SST-phytoplankton relationship exists in the Bay of Bengal and the implications of such a relationship on cholera dynamics. We found clear evidence of two independent physical drivers for phytoplankton abundance. The first one is the widely accepted phytoplankton blooming produced by the upwelling of cold, nutrient-rich deep ocean waters. The second, which explains the Bay of Bengal findings, is coastal phytoplankton blooming during high river discharges with terrestrial nutrients. Causal mechanisms should be understood when associating SST with phytoplankton and subsequent cholera outbreaks in regions where freshwater discharge are a predominant mechanism for phytoplankton production.

**Source:** http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3144830

## Resource Description

**Exposure :**

weather or climate related pathway by which climate change affects health

Food/Water Quality

**Food/Water Quality:** Pathogen

**Geographic Feature:**

resource focuses on specific type of geography

Freshwater

**Geographic Location:**

resource focuses on specific location

Non-United States

**Non-United States:** Asia

**Asian Region/Country:** Other Asian Region

**Other Asian Region:** Bay of Bengal

**Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Infectious Disease

**Infectious Disease:** Foodborne/Waterborne Disease

**Foodborne/Waterborne Disease:** Cholera

**Resource Type:** ☒

format or standard characteristic of resource

Research Article

**Timescale:** ☒

time period studied

Time Scale Unspecified